
NON-DESTRUCTIVE METHOD OF PREDICTING PERFORMANCE OF CERAMIC COMPONENTS

ABSTRACT

The invention is a method of qualifying an implantable ceramic component made of high-purity dense yttria tetragonal zirconium oxide polycrystal (Y-TZP) by application of non-destructive tests. Specifically, a qualified Y-TZP ceramic component or witness sample is examined by X-ray diffraction to determine the initial monoclinic phase content. The component or witness sample is exposed to steam at 127°C for a predetermined period of time, preferably six hours. The monoclinic phase content is determined for the post-exposure sample. The absolute difference between the initial monoclinic phase content and the post-exposure monoclinic phase content is calculated by difference. If the difference is less than 2.1% the sample is accepted. In an alternate embodiment, the components that pass the screening test are examined by ultrasonic testing to evaluate soundness of the ceramic component. Any component that presents a flaw of greater than three microns is rejected.